

Docket No. 520.43596X00
Serial No. 10/791,823
Office Action dated January 20, 2006

REMARKS

I. Introduction

By the present Amendment, claims 1 and 5 have been amended. No claims have been added or cancelled. Accordingly, claims 1-8 remain pending in the application. Claims 1 and 5 are independent.

II. Office Action Summary

In the Office Action of January 10, 2006, claim 1 was objected to because of an informality. Claims 1-8 were rejected under 35 U.S.C. §112, first paragraph. Claims 1-4 and 6-8 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,572,538 issued to Saitoh, et al. ("Saitoh"). Claims 1 – 8 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,309,319 issued to Messina in view of Saitoh. These rejections are respectfully traversed.

III. Claim Objections

Claim 1 was objected to because of a minor informality. This informality appears to have been a clerical oversight.

By the present Amendment, applicants have amended independent claim 1, in part, to address the typographical error cited in the Office Action. Accordingly, this objection should now be withdrawn.

IV. Rejections Under 35 USC §112

Claims 1-8 were rejected under 35 U.S.C. §112, first paragraph, as containing subject matter which was not described in the specification in such a way as to

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reasonably convey to one skilled in the art that the inventors had possession of the claimed invention at the time the application was filed. With respect to this rejection, the Office Action alleges that the claimed subject matter of "said ion exchange bag enables ion exchange through diffusion on a surface thereof" is not supported by the original disclosure. Applicants respectfully disagree.

As to the requirements for sustaining a rejection under 35 U.S.C. §112, first paragraph, Applicants note that the Patent Office bears the burden of presenting objective evidence to support such a rejection. The specification is not intended to be a tutorial. As noted by the Federal Circuit, "A patent is not a scientific treatise, but a document that presumes a readership skilled in the field of the invention." Emphasis added. See *Ajinomoto Co., Inc. v. Archer-Daniels-Midland Co.*, 228 F.3d 1338, 56 USPQ2d 1332, 1338 (Fed. Cir. 2000). Satisfaction of the written description requirement does not require *haec verba* antecedence in the originally filed application. See *Staehelin v. Secher*, 24 USPQ2d 1513, 1519 (B.P.A.I. 1992).

The Office Action alleges that claims 1-8 fail to comply with the written description requirement. However, Applicants' review of the specification appears to reveal indication for ion exchange by means of diffusion through the ion exchange bag. For example, the specification indicates that the ion exchange bag is water permeable. See page 7, lines 21-29. The specification goes on to indicate that ions within the cooling liquid are absorbed by the ion exchange bag due to diffusion. See page 8, lines 8-12 and page 10, lines 6-16. A skilled artisan would understand that the ion exchange bag enables absorption of ions in the cooling liquid as a result of being diffused through the water permeable surface of the ion exchange bag.

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Additionally, Applicants have amended independent claims 1 and 5 to clarify that the diffusion occurs on the water-permeable surfaces of the ion exchange bag.

It is therefore respectfully submitted that, as amended, the presently pending claims satisfy the written description requirements 35 U.S.C. §112, first paragraph.

V. Rejections under 35 U.S.C. §102

Claims 1-4 and 6-8 were rejected under 35 U.S.C. §102(b) as being anticipated by Saitoh. Regarding this rejection, the Office Action states that Saitoh discloses a liquid cooling system that comprises a pump for supplying a cooling liquid, a heat-receiving jacket, a radiator, and flow passages for circulating the cooling liquid in a route passing through the radiator. In particular, the Office Action alleges that Saitoh discloses an ion exchange bag having a water-permeable bag enclosing an ion exchange resin therein. The bag is held in a container and disposed downstream of the radiator. The Office Action also alleges that the ion exchange bag is part of the cooling system and upstream of the heat receiving jacket. Applicants respectfully disagree.

As amended, independent claim 1 defines a liquid cooling system for use in an electronic apparatus that includes a heat-generating element therein. The liquid cooling system comprises:

a pump for supplying a cooling liquid;
a heat-receiving jacket, being supplied with said cooling liquid, for receiving heat from the heat-generating element;
a radiator, being supplied with said cooling liquid passing through said heat-receiving jacket, for radiating heat therefrom;
flow passages for circulating said cooling liquid in a route passing through said radiator back to said pump, said flow passages including parts that generate corrosive ions therefrom; and

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a tank for accumulating said cooling liquid circulating within said flow passages, wherein:

an ion exchange bag, having water-permeable surfaces encloses an ion exchange resin therein, and is freely disposed in the cooling liquid accumulated within said tank, and

said ion exchange bag enables ion exchange through diffusion on almost all water-permeable surfaces thereof.

According to independent claim 1, the liquid cooling system includes a pump, a heat-receiving jacket, a radiator, flow passages, a tank, and an ion exchange bag. The pump is used for supplying a cooling liquid, while the heat-receiving jacket receives heat from the heat-generating element. The radiator is used to remove heat from the cooling liquid. Flow passages are used to circulate the cooling liquid in a route that passes through the radiator and back to the pump. Additionally, the flow passages include certain parts that generate corrosive ions. The tank is used to accumulate the cooling liquid being circulated within the flow passages. The ion exchange bag is provided with a water-permeable surface and freely disposed in the cooling liquid accumulated in the tank. Furthermore, the ion exchange bag contains an ion exchange resin and enables ion exchange through diffusion on the water-permeable surfaces.

Applicants disagree with the Office Action's contention that Saitoh anticipates the claimed invention. Applicants first point out that the burden falls on the Examiner to establish a *prima facie* case of anticipation for supporting a rejection under 35 U.S.C. §102. See *In re Sun*, 31 USPQ2d 1451, 1453 (Fed. Cir. 1993). As emphasized by the court in *In re Warner*, "[t]he precise language of 35 U.S.C. 102 that "a person shall be entitled to a patent unless," concerning novelty and unobviousness, clearly places a burden of proof on the Patent Office which requires

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it to produce the factual basis for its rejection of an application under sections 102 and 103. . . ." (Emphasis added) 154 USPQ 173, 177 (C.C.P.A. 1967), *cert. denied*, 389 U.S. 1057 (1968).

In order to qualify as an anticipatory reference, a prior art reference must necessarily disclose each and every element recited in the claimed invention. This disclosure must also be made with a sufficient level of clarity. See *Motorola, Inc. v. Interdigital Tech. Corp.*, 121 F.3d 1461, 43 USPQ2d 1481, 1490 (Fed. Cir. 1997). See also *In re Spada*, 911 F.2d 705, 708, 15 USPQ2d 1655, 1657 (Fed. Cir. 1990) ("[T]he [prior art] reference must describe the applicant's claimed invention sufficiently to have placed a person of ordinary skill in the field of the invention in possession of it." (citations omitted)). As further stated by the Federal Circuit, "Although this disclosure requirement presupposes the knowledge of one skilled in the art of the claimed invention, that presumed knowledge does not grant a license to read into the prior art reference teachings that are not there." (Emphasis added) *Id.*

Reference is further made to the decision of *In re Robertson*, 49 USPQ 2d 1949 (Fed. Cir. 1999), wherein the court pointed out that anticipation under 35 U.S.C. §102 requires that each and every element as set forth in the claim be found, either expressly or inherently described in a single prior art reference. As noted by that court, if the prior art reference does not expressly set forth a particular element of the claim, that reference still may anticipate if the element is "inherent" in its disclosure. To establish inherency, the extrinsic evidence "must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." (Emphasis added). Moreover, the court pointed out that inherency, however, may

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not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient. See also *In re Oelrich*, 666 F.2d 578, 581, 212 USPQ 323, 326 (C.C.P.A. 1981) ("Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.")

Finally, the alleged anticipatory reference must be enabling. In particular, it is the claimed invention that must be enabled within the reference and not any other teachings disclosed by the reference. See *Elan Pharms. Inc. v. Mayo Found. for Med. Educ. & Research*, 346 F.3d 1051, 68 USPQ2d 1373, 1375-76 (Fed. Cir. 2003) ("To serve as an anticipating reference, the reference must enable that which it is asserted to anticipate."); and *Amgen, Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1354, 65 USPQ2d 1385, 1416 (Fed. Cir. 2003) ("A claimed invention cannot be anticipated by a prior art reference if the allegedly anticipatory disclosures cited as prior art are not enabled.").

The Office Action alleges that Saitoh discloses all of the elements of independent claim 1. This is not the case, however. Saitoh discloses a laser apparatus and a cooling system therefor. The cooling system of Saitoh is configured as a large unit that is totally incapable for use as a cooling system for small electronic devices, such as, for example, a laptop computer. Thus, the system of Saitoh cannot be construed as enabling the claimed invention.

The Office Action's contention that any prior art structure capable of performing the intended use meets the claim limitation appears to be misplaced. Saitoh's cooling system may be capable of cooling certain laser devices, or even all laser devices. However, this is a far cry from cooling a small electronic apparatus such as a laptop computer. Saitoh's cooling system is in an entirely different field

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from the claimed invention, and therefore cannot be purposely misconstrued to contain elements that are analogous to the elements recited in the claims. According to the analogy set forth in the Office Action, the cooling system of Saitoh would also be capable of cooling any system including a nuclear reactor, automobile, etc. Clearly, this would not be possible.

The structure of the cooling system in Saitoh also differs from the claimed invention. Specifically, Saitoh provides an ion exchanger fixedly mounted within the tank. A meshed bag containing an ion exchange resin is disposed within the tank. A stop leaf is positioned near the top of the opening in the ion exchanger in order to restrain movement of the meshed bag and prevent the meshed bag from leaving the ion exchanger. Saitoh requires a pump having sufficient capacity to circulate all of the cooling fluid and also generate enough pressure to force the coolant through the tubular container that stores the ion exchange resin. See for example, col. 8, lines 43-56.

In contrast, for example, the ion exchange bag of the claimed invention has water-permeable surfaces and is freely disposed in the cooling liquid. Consequently, there are no additional structures required to fixedly secure the ion exchange bag to the tank.

The present invention is directed to small electronic devices such as laptop/notebook computers, projectors, that require significantly less coolant volume and circulation/flow. Further, the heat-generating elements in such devices are typically in the form of electronic components such as CPUs, chips, etc. As discussed in the specification, it is difficult to effectively cool such small electronic devices because of the small quantity of liquid coolant present in the system relative to the levels of corrosive ions that are being generated within the flow passages.

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Furthermore, the size of the electronic device restricts the size of the pump and flow restriction in the coolant path. More particularly, the rate of flow and pressure that exist in the system are relatively low. Accordingly, difficulties arise when ion exchange must take place.

The present invention provides an arrangement wherein the ion exchange bag is freely positioned within the tank, thereby being capable of movement within the tank to improve the exchange of ions. Additionally, the size of the ion exchange bag is small relative to the volume of the tank. Accordingly, it is possible for ion exchange to take place even when the electronic device is turned off and the pump is not working, because the ion exchange bag can move freely within the tank.

This configuration vastly differs from that of a laser device such as disclosed in Saitoh. Saitoh is in an entirely different field of endeavor, and does not even recognize the problems associated with cooling small electronic devices. It is therefore not clear how Saitoh could possibly provide a solution to the problems associated with cooling electronic devices. It is more likely that Saitoh would employ a larger capacity pump, or increase the level of coolant in the system, to address any issues of overheating in the laser apparatus. Additionally, the arrangement provided by Saitoh is ineffective at removing ions when the system is turned off. As illustrated in Fig. 4, the ion exchanger is positioned in a stationary manner and only operates when coolant is forced through under pressure. If the system is turned off, ions present in the tank cannot be filtered by the ion exchanger.

It is therefore respectfully submitted that independent claim 1 is allowable over the art of record.

Claims 2-4 and 6-8 depend from independent claim 1, and are therefore believed allowable for at least the reasons set forth above with respect to

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independent claim 1. In addition, these claims each introduce novel elements that independently render them patentable over the art of record.

VI. Rejections under 35 U.S.C. §103

Claims 1-8 were rejected under 35 U.S.C. §103(a) as being unpatentable over Messina in view of Saitoh. Regarding this rejection, the Office Action asserts that Messina discloses an electronic apparatus that includes most of the elements recited in independent claims 1 and 5. The Office Action admits that Messina does not disclose an ion exchange bag held within a container located upstream of the heat-receiving jacket and downstream of the radiator. The Office Action further notes that the use of an ion exchanger and filter is well known to be incorporated into the cooling system. Saitoh is relied upon for disclosing a cooling system having an ion exchange bag.

At the outset, Applicant would like to point out that a *prima facie* case of obviousness must be made in order to support a rejection under 35 U.S.C. §103. According to the Federal Circuit and the M.P.E.P., a *prima facie* case of obviousness requires that three basic criteria be met. First, there must be some suggestion or motivation in the primary reference to modify, combine, or seek out the teachings of a secondary reference. Second, there must be a realistic expectation of success from combining the two references. Finally, the prior art references must clearly teach or suggest all the claim limitations. See M.P.E.P. §706.02(j). The Federal Circuit has consistently supported the requirements of the M.P.E.P. in stating, for example, that "[i]n proceedings before the Patent and Trademark Office, the Examiner bears the burden of establishing a *prima facie* case of obviousness based upon the prior art." *In re Fritch*, 972 F.2d 1260, 23 USPQ 2d 1780 (Fed. Cir. 1992).

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In the decision of *In re Fine*, 5 USPQ 2d 1596 (Fed. Cir. 1988), the court pointed out that the PTO has the burden under '103 to establish a prima facie case of obviousness and can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. As noted by the court, whether a particular combination might be "obvious to try" is not a legitimate test of patentability and obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. As further noted by the court, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.

Furthermore, such requirements have been clarified in the decision of *In re Lee*, 61 USPQ 2d 1430 (Fed. Cir. 2002) wherein the court in reversing an obviousness rejection indicated that deficiencies of the cited references cannot be remedied with conclusions about what is "basic knowledge" or "common knowledge".

The court pointed out:

The Examiner's conclusory statements that "the demonstration mode is just a programmable feature which can be used in many different device[s] for providing automatic introduction by adding the proper programming software" and that "another motivation would be that the automatic demonstration mode is user friendly and it functions as a tutorial" do not adequately address the issue of motivation to combine. This factual question of motivation is immaterial to patentability, and could not be resolved on subjected belief and unknown authority. It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to "[use] that which the inventor taught against its teacher."... Thus, the Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the

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reasoning by which the findings are deemed to support the agency's conclusion. (emphasis added)

As admitted in the Office Action, Messina does not disclose an ion exchange bag located upstream of the heat-receiving jacket and downstream of the radiator. The Office Action further notes that the use of an ion exchanger and filter is well known to be incorporated into the cooling system. Saitoh is relied upon for disclosing a cooling system having an ion exchange bag. This reliance appears to be misplaced.

First, the references appear to be in different fields of endeavor. The system of Messina is designed for cooling large scale electronic components that require power dissipation in the range of 75 to 120+ watts. See column 4, lines 51 to 55 of Messina. Messina does not even address or recognize the problems addressed by the claimed invention. Thus, a skilled artisan seeking to provide a cooling system for a small electronic device such as, for example, a laptop computer would not seek out the teachings of Messina to provide such a system.

On the other hand, Saitoh discloses a system designed for cooling a laser apparatus which, in and of itself, is entirely different from the claimed invention or Messina. Such systems typically require large quantities of cooling fluid and high volume pumps. Saitoh also provides a system wherein the ion exchanger is fixedly secured within the tank and only functions when coolant is pumped through the ion exchanger under pressure.

Assuming that a skilled artisan where to even consider the teachings of Messina, there is simply no motivation to seek out and combine the teachings of Saitoh to arrive at the claimed invention. This is so because both references appear to be in different fields of endeavor from each other. Furthermore, the fields of

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endeavor of the references differ from that of the claimed invention. In fact, neither Messina nor Saitoh recognizes the problem addressed by the present invention. Consequently, neither reference would be capable of providing any suggestion for arriving at a solution such as that provided in the instant invention and recited in the present claims, with a realistic expectation of success.

Furthermore, even if these two references were properly combinable, they would still fail to disclose or suggest all the features recited in independent claim 1. As previously discussed, Saitoh fails to provide any suggestion for an ion exchange bag that is freely disposed within the coolant tank. Messina is completely silent on specific configurations for the ion exchanger. Applicants respectfully submit that this silence cannot be construed as disclosing or suggesting features that are recited in the claims. As previously indicated, the combined references must disclose or suggest all the features recited in the claims in order to make a *prima facie* case of obviousness.

It is therefore respectfully submitted that independent claim 1 is allowable over the art of record.

Claims 2-4 and 6-8 depend from independent claim 1, and are therefore believed allowable for at least the reasons set forth above with respect to independent claim 1. In addition, these claims each introduce novel elements that independently render them patentable over the art of record.

As amended, independent claim 5 defines an electronic apparatus that comprises:

a heat-generation element mounted on a substrate;
 a heat-receiving jacket, being thermally connected to said heat-generation element;

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a heat radiation jacket for radiating heat of a heated liquid supplied from said heat-receiving jacket;
a pump for circulating the liquid to those jackets;
and
a piping for connecting said pump and said both jackets, wherein:
an ion exchange bag, having a water-permeable bag enclosing ion exchange resin therein, is freely disposed in said piping, and
said ion exchange bag enables ion exchange through diffusion on water-permeable surfaces thereof.

Independent claim 5 recites limitations that are somewhat similar to those recited in independent claim 1. For example, independent claim 5 provides an ion exchange bag having a water-permeable bag that is freely disposed in the piping. As previously discussed with respect to independent claim 1, the applied reference fail to disclose such features

It is therefore respectfully submitted that independent claim 5 is allowable over the art of record.

VII. Conclusion

For the reasons stated above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a Notice of Allowance is believed in order, and courteously solicited.

If the Examiner believes that there are any matters which can be resolved by way of either a personal or telephone interview, the Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.

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AUTHORIZATION

Applicants request any shortage or excess in fees in connection with the filing of this paper, including extension of time fees, and for which no other form of payment is offered, be charged or credited to Deposit Account No. 01-2135 (Case: 520.43596X00).

Respectfully submitted,
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